SPINNER

Contactless Data & Power Transmission for Rotating Applications

Data (Real Time) & Power Transmission

ETHERNET POWERLINK

HIGH FREQUENCY PERFORMANCE WORLDWIDE

www.spinner-group.com

SPINNER

The SPINNER Group

For more than 70 years, the SPINNER Group has been setting new standards worldwide in high-frequency technology. Based in Munich with production facilities in Germany, Hungary and China, SPINNER currently has over 1,000 employees. Our international network of subsidiaries and distributors supports customers in over 40 countries.

SPINNER Rotating Solutions

SPINNER has become one of the leading manufacturers in **rotary joints** thanks to its innovative approach, technical expertise, and high standards of quality. Our products are used in **maritime applications (both above and below water), on land, in the air, and in space**.

Across all applications, the trend toward digitization and increasing data transmission rates is continuing. Our contactless modules for rotating systems deliver benefits whenever slip rings are inadequate due to large outer diameters and/or high data transmission rates.


WIND ENERGY


INDUSTRY


SATCOM

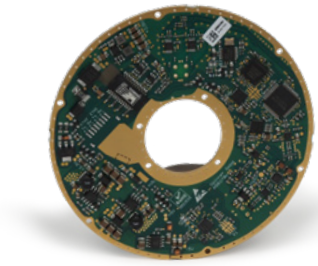

SUBSEA/OFFSHORE

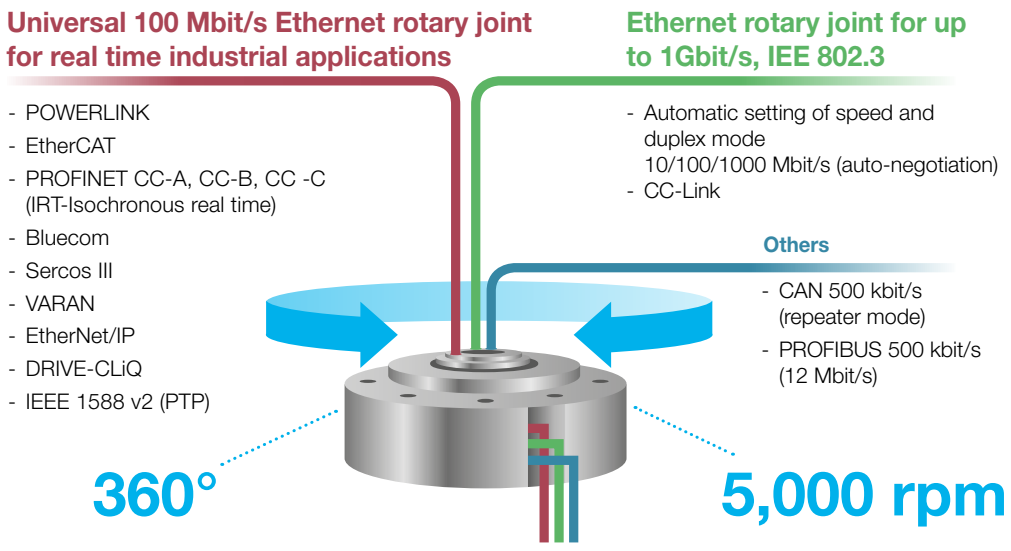

SPACE


RADAR

Key Features of Our Data Couplers

- Real time data transmission at 100 Mbit/s and 99% bus traffic; multiplexing of two independent channels
- Multi-channel designs on request, as well as simultaneous transmission of other bus protocols parallel to real time protocols
- Maximum immunity to interference due to enclosed design, no Wi-Fi used
- Works at any direction of rotation and rotational speed from 0 to 5000 r/min with constant transmission quality; ready for use immediately after system power-up
- All-in-one PCB design: No adjustments, no additional gateways or data converter necessary
- Maximum reliability and long service life thanks to frictionless, maintenance-free operation
- Modules with free inner diameters of up to 320 mm available on request
- Combinations available with contactless power transmission of up to 750 W at 48 V DC





Contactless Data Transmission in Real Time

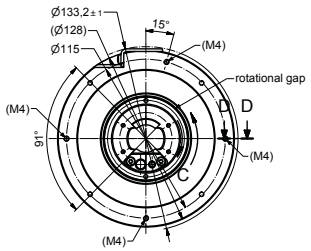
Like in many other areas of technology, Ethernet is used as a standard interface for data transmission. SPINNER has developed a contactless coupler (module) that is available with clear inner diameters between 20 mm and 100 mm.

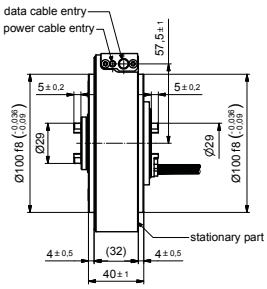
In contrast to conventional slip rings, all sizes of Ethernet module also support Gigabit Ethernet. The correct standard is automatically detected and transmitted: 10BASE-T (10 Mbit/s), Fast Ethernet (100 Mbit/s), Gigabit Ethernet (1 Gbit/s) or fixed at 100 MBit/s for real time data transfer.

All Ethernet data transmitters are fully compatible with Profinet (class A and B) without the need for any adjustments. The Profinet Class C (IRT) real-time version also supports other real time protocols.
The **1 Gbit module** supports **CC-Link**.

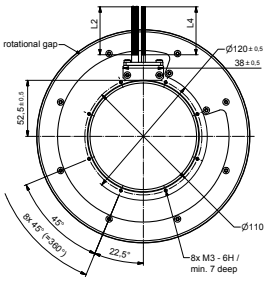
Data Transmission Modules

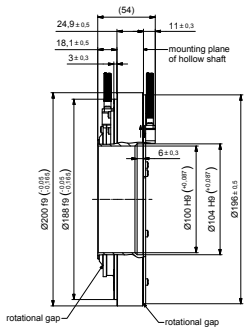
BN 637421 (20 mm clear inner diameter):





BN 637426 (100 mm clear inner diameter):





Available configurations for all modules:

Type X	
1	1000BASE-T Ethernet according to IEE 802.3
3	CAN channel (500 kbit/s repeater)
4	1 channel 100BASE-TX, for real time Ethernet applications*
7	2 channels 100BASE-TX, multiplexed, for real time Ethernet applications*
9	Profibus DP according to IEC 61158, 500 kbit/s (12 Mbit/s on request)

*Semi-duplex on request

Contactless Data Transmission Module in Real Time

Example: Type 1 - BN 637421C0001 (1 Gbit/s Ethernet)

1000BASE-T Ethernet-Channel	One contactless coupler for one channel
Supported Ethernet standards	10BASE-T (IEEE 802.3 clause 14) 100BASE-TX (IEEE 802.3 clause 25) 1000BASE-T (IEEE 802.3 clause 40) Includes autonegotiation for automatically selecting the Etherned standard and full/ semi duplex mode
OSI layer operation	Layer 1 and 2
Supported protocols	Profinet CC-A, CC-B, CC-Link
Ethernet frame loss ratio according to RFC2544	$\leq 1 \times 10^{-9}$ Measured for 800s with 64-byte frames at 99% channel utilization, corresponding to BER $\leq 1 \times 10^{-12}$
Data interface connection	Cat. 6A S/FTP 4x2xAWG26/7 (PiMF) on stator and rotor side

Example: Type 7 - BN 637426C0007 (2 Channel Multiplexed Profinet Class C)

100BASE-TX Ethernet Channel	Two signal channels over one contactless transmission channel, signals are multiplexed, no redundancy
Supported Ethernet standards	100BASE-TX (IEEE 802.3 clause 25), autonegotiation (full duplex only)
Supported protocols	Profinet CC-A, CC-B, CC-C (IRT), POWERLINK, EtherCAT* and others
OSI layer operation	Layer 1 (physical)
Multiplexer	Time domain multiplexing
Ethernet frame loss ratio according to RFC2544	$\leq 1 \times 10^{-9}$ Measured for 8000s with 64 byte frames at 99% channel utilization, corresponds to BER $\leq 1 \times 10^{-12}$
Data interface connection	Cat. 6A S/FTP 4x2xAWG26/7 (PiMF) on stator and rotor side

*LLF signaling in preperation

Example: Type 9 - BN 637421C0009 (1 Channel Profibus)

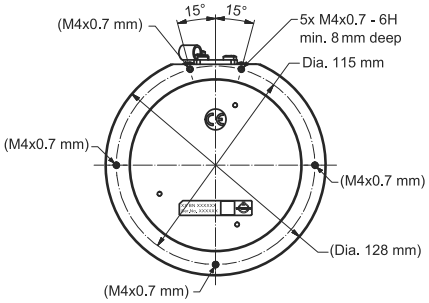
Supported PROFIBUS standards:	PROFIBUS DP according to IEC 61158
Signal channel characteristics:	PROFIBUS DP, RS-485, semi-duplex
Data format/rate	UART (11 Bit, NRZ)/500 KB/s (12 MB/s on request)
Termination	Internal, permanently terminated

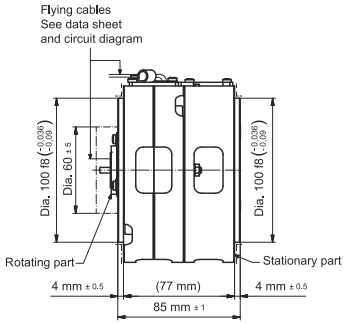
Power Transmission Module

SPINNER's contactless power transmission system is a rotationally symmetrical system for contactless transmission of electric energy. This transmission system is used to supply DC voltage to control systems, sensors, or other consumers on rotating shafts.

The transmission system works like a galvanically isolated DC voltage transmitter. It keeps the output voltage nearly constant over a wide input range, regardless of the load. The output has a short-circuit-proof and open-circuit-proof design. A major advantage is the presence of a hollow shaft, thus permitting combinations with optical single-channel or multi-channel rotary joints for data transmission. This DC/DC converter conforms to all common industry standards with respect to safety, interference immunity, and emitted interference. DC/DC converters for 24 V are available for up to 300 W, other output voltages such as 48 V for output power up to 750 W on request.

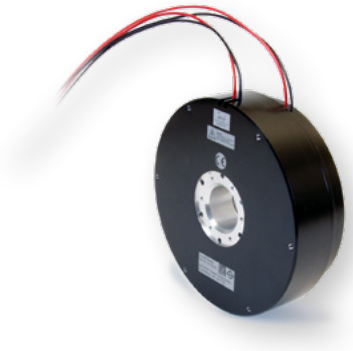
Combination of Ethernet and Power Module BN 636684C0001 (1Gbit/s Ethernet, DC/DC Converter 24 V DC 100 W)





BN 636688 - 100 W

BN 636695 - 300 W



Standalone Module DC/DC Converter BN 636695

Input voltage	21.6 V - 28.0 V DC
Output voltage	24 V DC ± 3%
Nominal output current	125 A
Max. output ripple	80 mV
Efficiency, typ.	85% at full load
Max. rotational speed / optionally up to	600 rpm / 1500 rpm
Min. service life	200 x 10^6 revolutions
MTBF	300,000 hours
Standards	DIN EN 55022, DIN EN 61000-4-2, DIN EN 61000-4-3, DIN EN 61000-4-4, DIN EN 61000-4-6
EU Directive	EMC Directive 2004/108/EC

Contactless Data Transmission in Real Time for Pitch Controls

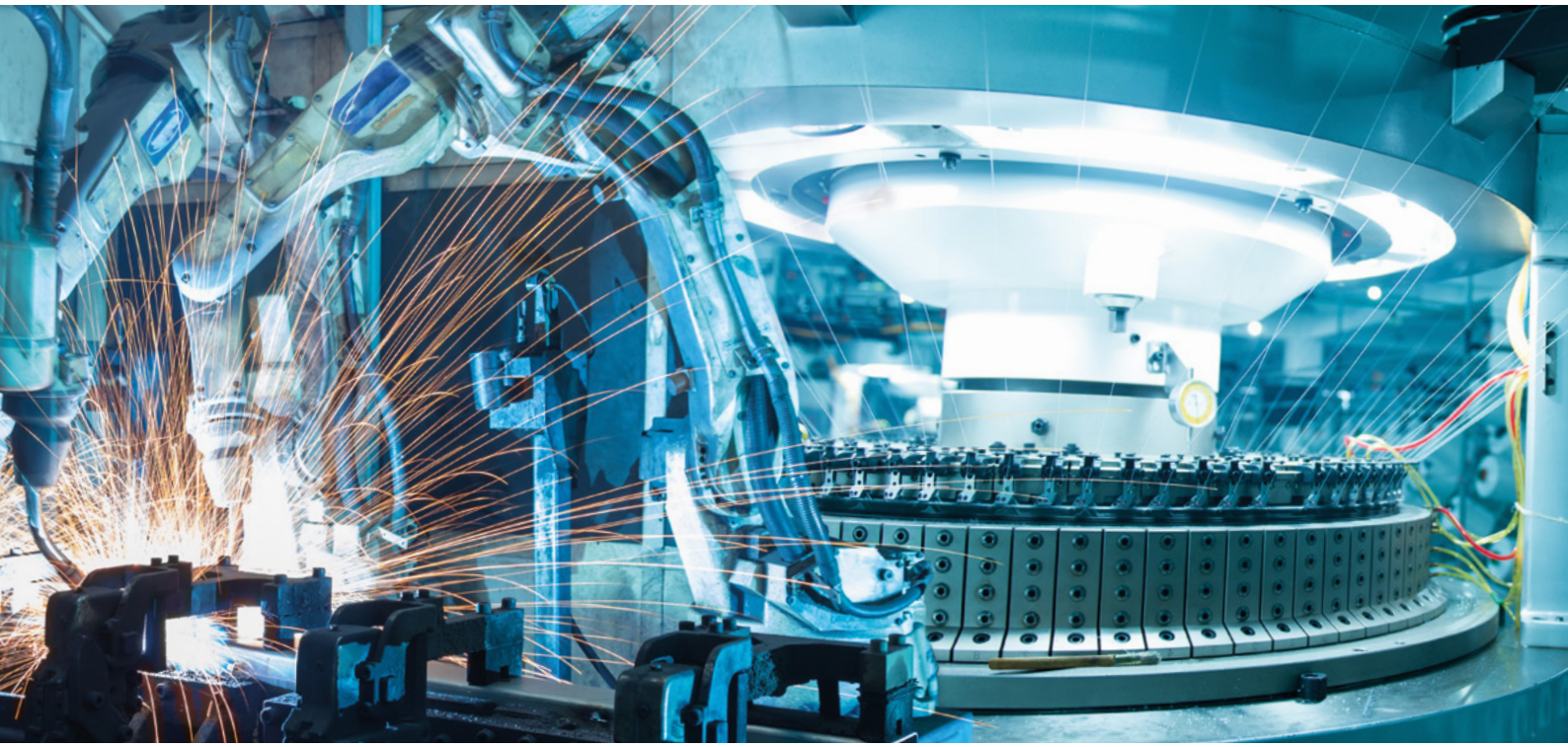
Real time data transmission module

SPINNER FORJ 1.17 for wind turbines (IP 68)

Contactless digital transmission in pitch slip rings can increase the reliability of wind power stations for pitch controls. BUS systems including **EtherCAT, Profinet, Profibus and CAN** are currently used, with the signals being transmitted by slip rings. Due to natural wear of the slip rings, downtimes for maintenance are inevitable.

SPINNER's contactless data transmitters for popular BUS systems experience no wear and therefore minimize downtimes and operating and maintenance costs. The data transmitters can also be combined with a fiber-optic rotary joint for redundancy.

Special Modules for Industrial Applications



Contactless power and data transmission module* (48 V/750 W)

100 mm contactless data transmission with internal 6-way slip ring

12 V/30 W contactless power for 360° sight systems with single-channel FORJ

Contactless data and power transmission modules can be used in various industrial applications:

- Battery production machines
- Robotic systems
- Packaging machines
- Amusement park rides
- Turntables
- Injection molding machines
- Blow molding machines
- Wallpaper production machines
- Cable reels
- Machine tools

*On request, custom electronics can be integrated by altering the mechanical shape.

HIGH FREQUENCY PERFORMANCE WORLDWIDE

SPINNER designs and builds cutting-edge radio frequency systems, setting performance and longevity standards for others to follow. The company's track record of innovation dates back to 1946, and many of today's mainstream products are rooted in SPINNER inventions.

Industry leaders continue to count on SPINNER's engineering excellence to drive down their costs of service and ownership with premium-quality, off-the-shelf products and custom solutions. Headquartered in Munich, Germany, the global frontrunner in RF components remains the first choice in simple-yet-smart RF solutions.

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